

**REMARKS**

The Office Action mailed July 20, 2010 presents the examination of claims 1, 69-71, 78, 91 and 92, claims 60-67, 79, 81, and 83-90 being withdrawn following restriction.

The present Amendment cancels all of claims 1-92, and presents new claims 93-118. This approach to amendment was taken for its editorial simplicity.

In new claim 93, that "at least one" cupric silicate is employed is described at the text bridging pp. 3-4 of the specification.

Also in the claims, the composition with which the microbes are to be contacted is described as one comprising crystalline cupric silicate (or other metal silicate). The crystalline nature of the metal silicate is disclosed in the specification via the X-ray diffraction spectra of the products used in the invention shown in Figures 1C, 2C, 5C and 6C.

Immobilization of the cupric silicate (as in *e.g.* claim 94), is described at page 60, lines 10-12 of the specification. The particular materials used for immobilization (*e.g.* claim 105) are described at page 62, lines 26-33.

In new claim 107, describing process steps for preparing the cupric silicates used in the invention, step i) is supported by the specification at page 37, line 32 ("acidic"), taken with "neutral reaction conditions (pH 6-7)" (*i.e.* pH 6 is considered "neutral") at page 40, line 22. Steps ii) and iii) (collecting and washing the precipitate) is supported at page 39, lines 30-32.

The particular microbes recited in the claims (*e.g.* claims 99-101) are those previously presented in claims 69-71.

All other features in the claims have been previously presented.

No new matter is introduced by any amendment.

**Restriction/election**

All of the new claims are directed to the previously elected invention, *i.e.* restriction group 1, directed to a method for controlling microbes. New claims 93-107 are directed to the

previously elected species, *i.e.* cupric silicates. New claims 108 - 110 are generic, and new claims 111 - 118 are directed to withdrawn species.

Statement of substance of interview

On October 27, 2010, a telephone interview was held with the Examiner and his supervisor to discuss possible claim amendments so as to advance the prosecution of the present application. Although agreement as to specific language that would be deemed allowable was not reached, the Examiners agreed that language relating to the physical form of the silicates used in the claimed method or language relating to the process for their preparation might be sufficient to distinguish the claimed invention from the prior art.

The present amendments to the claims reflect the discussion in the interview.

Rejections under 35 USC § 112, second paragraph

Claim 1 is rejected under 35 USC § 112, second paragraph as being indefinite - the Examiner finds the claim to be in effect a Markush styled claim, but that it lacks the proper language of such.

Claims 1 and 91 are rejected under the same statute as indefinite in reciting both a broad and narrow range for a parameter within the same claim.

The present amendments to the claims address these grounds of rejection.

Rejection for obviousness

Claims 1, 69-71 and 91 are rejected under 35 USC § 103(a) as being unpatentable over Komatsu JP '013. This rejection is respectfully traversed. Reconsideration and withdrawal thereof are requested.

Applicants submit that the Examiner fails to establish a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The Examiner asserts that Komatsu describes "the compound" (*i.e.* "cupric silicate") as antibacterial and useful in anti-fouling coatings. Thus, the Examiner deems it obvious that "the

compound" can be contacted with microbes to antimicrobial effect. The particular microbes recited in claims 69-71 (now 99-101) are deemed to be obvious as these microbes are deemed normally occurring in waters plied by ships to which Komatsu's composition would be applied.

Applicants submit that Komatsu fails to disclose or suggest at least one feature of the present invention.

The "cupric silicates" of the invention are those prepared under acidic conditions, which are defined in the specification as a condition of pH less than 6. (See, e.g. the specification at page 37, line 32 ("acidic"), taken with "neutral reaction conditions (pH 6-7).") The present claims recite the results of this aspect of the preparation process.

In the examples of the specification, the preparation under acidic conditions results in particular ratios of silica to copper as recited in the claims, and although Komatsu recites a broad range for this ratio, the specific ratios recited in the claims (e.g. claims 95, 96, 108 and 111-118) are not specifically disclosed by Komatsu. There is certainly no teaching that provides any "blazemarks" to the particular ratios recited in the above claims. *In re Baird*, 29 USPQ2d 1550 (Fed. Cir. 1994).

Furthermore, a composition comprising a crystalline cupric silicate is used in the present invention, whereas that used by Komatsu is amorphous in nature. (See, e.g., paragraph [0012] of the machine translation.) Thus, this second feature of the invention is also not disclosed or suggested by Komatsu; indeed the reference teaches away from the invention.

With respect to claims 97, 98 and 104 (and withdrawn claims 111-118), the claims recite particular values of ESR peaks and X-ray diffraction peaks that are not at all disclosed or suggested by Komatsu. Indeed, the cupric silicates prepared by Komatsu have the completely flat X-ray diffraction spectrum (see, Figure 1 of the reference) that is indicative of an amorphous structure. Accordingly, use of these particular cupric silicates is not obvious in view of the reference.

Finally, claim 107 recites explicitly a process step that provides the results stated in the other claims above. In particular, preparation of the cupric silicate under acidic conditions, i.e. "pH below 6", provides an antimicrobial composition. The importance of this aspect of the preparation of the cupric silicates is demonstrated experimentally in the specification.

Applicants have established that cupric silicates can be obtained in different forms, e.g.:

- a) a 1<sup>st</sup> form having a silica to copper ratio of 1:0.34;
- b) a 2<sup>nd</sup> form having a silica to copper ratio of 1:0.53;
- c) a 3<sup>rd</sup> form having a silica to copper ratio of 1:0.8;
- d) a 4<sup>th</sup> form having a silica to copper ratio of 1:1;
- e) a 5<sup>th</sup> form having a silica to copper ratio of 1:0.78; and
- f) a 6<sup>th</sup> form having a silica to copper ratio of 1:515.

Each of the aforesaid cupric silicate products exhibits a different X-ray diffraction pattern, and so each has its own unique form.

Comparing Examples 1 and 2 of the specification, one sees that, although the cupric silicate products have different forms, both of the products, which are formed under acidic conditions, exhibit the desired anti-microbial property.

Comparing Examples 3 and 4 of the specification, one notes that both of the products, which are of different forms obtained under non-acidic conditions, do not exhibit an anti-microbial property.

Then, comparing Examples 2 and 4 of the specification, one can see that, although in both cases the starting materials are substantially identical, both the products exhibit different properties with regard to anti-microbial activity. Only the product prepared under acidic conditions exhibits an anti-microbial activity while the other product, which is obtained under basic conditions, does not exhibit an anti-microbial property.

Komatsu does not include any disclosure or suggestion whatsoever of this important feature of the invention. Accordingly, the present invention is not *prima facie* obvious over Komatsu, and the present rejection should be withdrawn.

Claims 1, 69-71 and 78 are rejected under 35 USC § 103(a) as being unpatentable over Komatsu in view of Sheen and Samad. This rejection is respectfully traversed. Reconsideration and withdrawal thereof are requested.

The deficiencies of Komatsu are explained above. Applicants submit that the further inclusion of either or both of Sheen and Samad does not remedy these deficiencies.

In particular, Sheen discloses an aqueous solution of an acidified copper silicate (col. 2, lines 34-46). In embodiments where the water solvent is removed, the resulting dried acidic copper silicate is indicated as amorphous (col. 2, line 52). Thus, Sheen, like Komatsu, fails to disclose or suggest any of the physical aspects of the cupric silicate that are recited in the present claims. Samad fails to disclose or suggest any silicates at all.

Since the collection of Komatsu, Sheen and Samad fails to disclose or suggest at least one feature recited in the present claims, the Examiner fails to establish a *prima facie* case of obviousness of the invention, and the instant rejection should be withdrawn.

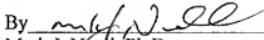
In view of the above amendment and remarks, applicant believes the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Mark J. Nuell, Ph.D., Reg. No. 36,623, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Dated: January 20, 2011

Respectfully submitted,

By   
Mark J. Nuell, Ph.D.  
Registration No.: 36,623  
BIRCH, STEWART, KOLASCH & BIRCH, LLP  
12770 High Bluff Drive, Suite 260  
San Diego, California 92130  
(858) 792-8855  
Attorney for Applicant